

REMARKS

Claims 1-8, which are pending in the Application remain rejected under 35 USC 103(a) as being obvious over GB 2,262,527, Bujara et al.

Arguments

Summary of Applicants' Arguments

While the Examiner may be correct in citing Bujara et al for the proposition that it avoids some of the typical disadvantages of the prior art, Bujara et al nonetheless falls short of teaching or suggesting the claimed rejection. More specifically, Bujara falls short of teaching or suggesting the use of a gas stream comprising **steam**, and an inert gas or air.

In this regard, Applicants direct the Examiner's attention to page 3, lines 13 - 25 of the captioned application, which describes and distinguishes Bujara as follows:

"Processes are already known that avoid one or more of the aforementioned disadvantages. For example, GB-A-2 262 527 describes a process for the comminution of cellulose derivatives by gelling a cellulose ether with a water content of 30 to 80 wt. % by cooling to a temperature of -10° to 60°C followed by mill drying of the gel (preferably in an impact mill). In this process however air or nitrogen is used for the drying and conveying, which is then not recycled. The energy expended in carrying out the process is thus considerably higher than is theoretically necessary for evaporating the water contained in the ground material. Also, GB-A-2 262 527 does not give any indication of how to proceed with hydroxyethylated mixed ethers of methyl cellulose (such as for example methylhydroxyethyl cellulose or methylhydroxypropylhydroxyethyl cellulose) in order to obtain a product having a bulk density of greater than 300 g/l. The end product of the mill drying of methyl cellulose (Example 3) with a bulk density of 270 g/l is also not satisfactory."(Delineation is for emphasis).

Applicants' averments of the difference between Bujara and the claims remain undisputed. Applicants reiterate the patentable distinction of the claims over Bujara by presenting a summary of the invention, issues presented, a statement of the rejection and how they have been overcome or avoided.

Summary of the Invention

The present invention relates to a process for producing particulate water-soluble cellulose derivatives, comprising:

- a) forming a feed composition comprising a cellulose derivative (e.g., being present in an amount of 20 wt. % to 50 wt. %, based on the total weight of the feed composition) and 50 wt. % to 80 wt. % of water, based on the total weight of the feed composition, wherein the cellulose derivative is at least one of swelled and dissolved in the feed composition;
- b) contacting, in a high rotational speed gas jet impact mill, the feed composition with a superheated gas mixture selected from (i) a superheated gaseous mixture of **steam** and an inert gas, and (ii) a superheated gas mixture of **steam** and air, (thus converting at least a portion of the water of the feed composition into the vapor phase), thereby converting the cellulose derivative of the feed composition into a solid state form of finely particulate particles, wherein the superheated gas mixture has a steam content of 40 wt. % to 99 wt. %, based on the total weight of the superheated gas mixture;
- c) separating the particulate cellulose derivative from the superheated gas mixture; and
- d) optionally drying the particulate cellulose derivative.

It has been found that the cellulose derivative solid particles produced using the process of the present invention have a high bulk density combined with a good flowability, and the proportion of fines in the product is very low. There is no decrease, or only a minimal decrease, in viscosity compared to the starting products.

It was also found that the overall energy requirement of the process is reduced or virtually unchanged compared to the processes of the prior art, and since the heat exchange gas consists of a superheated steam/inert gas mixture or steam/air mixture, the energy used for the grinding is recovered, in the form of thermal energy, in the heat exchange gas and can thus be utilized or preferably converted into other

forms of energy. It was also surprisingly found that no films or agglomerations are formed in the grinding plant and the maintenance expenditure is thus low.

Issues Presented

- (1) Whether in the determination of obviousness of the claims under 35 USC 103(a), there is a basis of record for modifying Bujara to employ superheated gas mixture selected from (i) a superheated gaseous mixture of steam and an inert gas, and (ii) a superheated gas mixture of steam and air, wherein the superheated gas mixture has a steam content of 40 wt. % to 99 wt. %, based on the total weight of the superheated gas mixture.
- (2) Whether in the determination of obviousness of the claimed invention, there is a basis for the belief that the proposed modification with a reasonable expectation of success of employing superheated gas mixture having a steam content of 40 wt. % to 99 wt. %, based on the total weight of the superheated gas mixture.
- (3) Whether the advantages of the claimed invention rebut any presumption of obviousness.

Details of Applicants Arguments

Statement of the Rejection

The claims stand rejected on the grounds that:

"Bujara et al teach of a process of a process of making water-soluble cellulose derivatives of particulate size, (see Example 1). Bujara et al teach of the gellation of a cellulose derivative, wherein the water content is between 30 to 80 wt.%, (see page 5, lines 31-34). Bujara et al. also disclose of using various types of mills, in particular an impact mill is used for the cellulose compounds, (see page 10)."

In ascertaining the difference between Bujara et al's teachings and the claims, the Examiner finds that:

"The instant claims differ over the prior art by reciting specific ranges of the degree of substitution of the ether derivatives of cellulose."

Statement of How the Claims Avoid or Overcome the Rejection

When the Bujara et al and the claimed invention are considered as a whole it becomes quite clear that they further differ, with particular reference to the step of contacting, in a high rotational speed gas jet impact mill, the feed composition with a superheated gas mixture selected from (i) a superheated gaseous mixture of **steam** and an inert gas, and (ii) a superheated gas mixture of **steam** and air, (thus converting at least a portion of the water of the feed composition into the vapor phase), thereby converting the cellulose derivative of the feed composition into a solid state form of finely particulate particles, wherein the superheated gas mixture has a steam content of 40 wt. % to 99 wt. %, based on the total weight of the superheated gas mixture.

It is well established in the law that to make prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art, In re Royka, 180 USPQ 589 (CCPA 1974). All words in the claim must be considered in judging patentability of a claim against the prior art, In re Wilson 165 USPQ 494 (CCPA 1970).

Lacking from the prior art is the claim element of contacting the feed with composition with a superheated gas mixture selected from (i) a superheated gaseous mixture of **steam** and an inert gas, and (ii) a superheated gas mixture of **steam** and air. No inference of this step is found in the prior art. As such, the record would not support a prima facie case of obviousness. Applicants therefore pray for the withdrawal of the rejection based on Bujara et al.

Bujara et al is discussed more fully hereunder to show that the difference in its understanding and expectation is such as would not have led to the claims. In the best light, Bujara discloses the use of transporting gas for conveying its cellulose compounds. More specifically, at page 10, lines 27-30, Bujara et al discloses that:

"In the impact mill the cellulose compound is preferably conveyed by a gas stream, such as air, onto a rotating rotor equipped with grinding bars."

In this regard, Bujara refers to air flow and air temperature. The teaching of the use of transporting gas to convey the cellulose compounds provides no basis for inferring the claim recited use of superheated gaseous mixture selected from (i) a superheated gaseous mixture of **steam** and an inert gas, and (ii) a superheated gas mixture of **steam** and air. The patentable distinction is all the more appreciated when one considers the following advantages or properties of the invention: (1) The cellulose derivative solid particles produced using the process of the present invention have a high bulk density combined with a good flowability, and the proportion of fines in the product is very low ($<15\mu\text{m}$). There is no decrease, or only a minimal decrease, in viscosity compared to the starting products. (2) The overall energy requirement of the process is reduced or virtually unchanged compared to the processes of the prior art. Since the heat exchange gas consists of a superheated steam/inert gas mixture or steam/air mixture, the energy used for the grinding is recovered, in the form of thermal energy, in the heat exchange gas and can thus be utilized or preferably converted into other forms of energy. (3) Surprisingly, no films or agglomerations are formed in the grinding plant, hence the maintenance expenditure is thus low.


When the claimed invention and its advantages are considered, it becomes quite clear that the claims are patentable over Bujara et al, In re Papesh 137 USPQ 43 (CCPA 1963). Differently put, the stated advantages rebut any presumption of obviousness.

In view of the foregoing, it is Applicants' submission that the claimed invention is patentably distinct over the prior art, and that the Examiner is justified in allowing the same.

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